HRS DOCUMENTATION RECORD COVER SHEET

Name of Site: AMCO Chemical
EPA ID No.: CA0001576081

Contact Persons

Site Investigation:	Ecology and Environment, Inc., Superfund Technical Assessment and Response Team - Region 9
Documentation Record:	Carolyn Douglas, U.S. Environmental Protection Agency - Region 9

Pathways, Components, or Threats Not Scored

Ground Water Pathway: Although the ground water below the site contains contaminants significantly above background concentrations, there are no drinking water wells within 4 miles of the site. Therefore, this pathway would not contribute significantly to the HRS site score.

Surface Water Pathway: Attributing contamination in Oakland's Inner Harbor or the San Francisco Bay to the site would be problematic, given the site's location in an urban industrial area. Oakland Inner Harbor is located approximately 0.75 mile to the south of the site, and the San Francisco Bay is located approximately 2 miles west of the site.

Soil Exposure Pathway: It is unlikely that the public could directly come in contact with the source at this site as the AMCO Chemical property is covered with concrete. Therefore, this pathway would not contribute significantly to the HRS site score.

HRS DOCUMENTATION RECORD

Name of Site: AMCO Chemical

EPA Region: 09 Date Prepared: April 2003

Street Address of Site: 1414 Third Street

City, County, State: Oakland, Alameda County, California

General Location in the State: Coastal North-Central California

Topographic Map: Oakland West, California (Ref. 3)

Latitude: 37 º 48' 09" North Longitude: 122 º 17' 37.5" West

Reference Point: The corner of Third Street and Mandela Parkway (Ref. 4)

Scores

Air Pathway	100.00
Ground Water Pathway	NS
Soil Exposure Pathway	NS
Surface Water Pathway	NS
HRS SITE SCORE	50.00

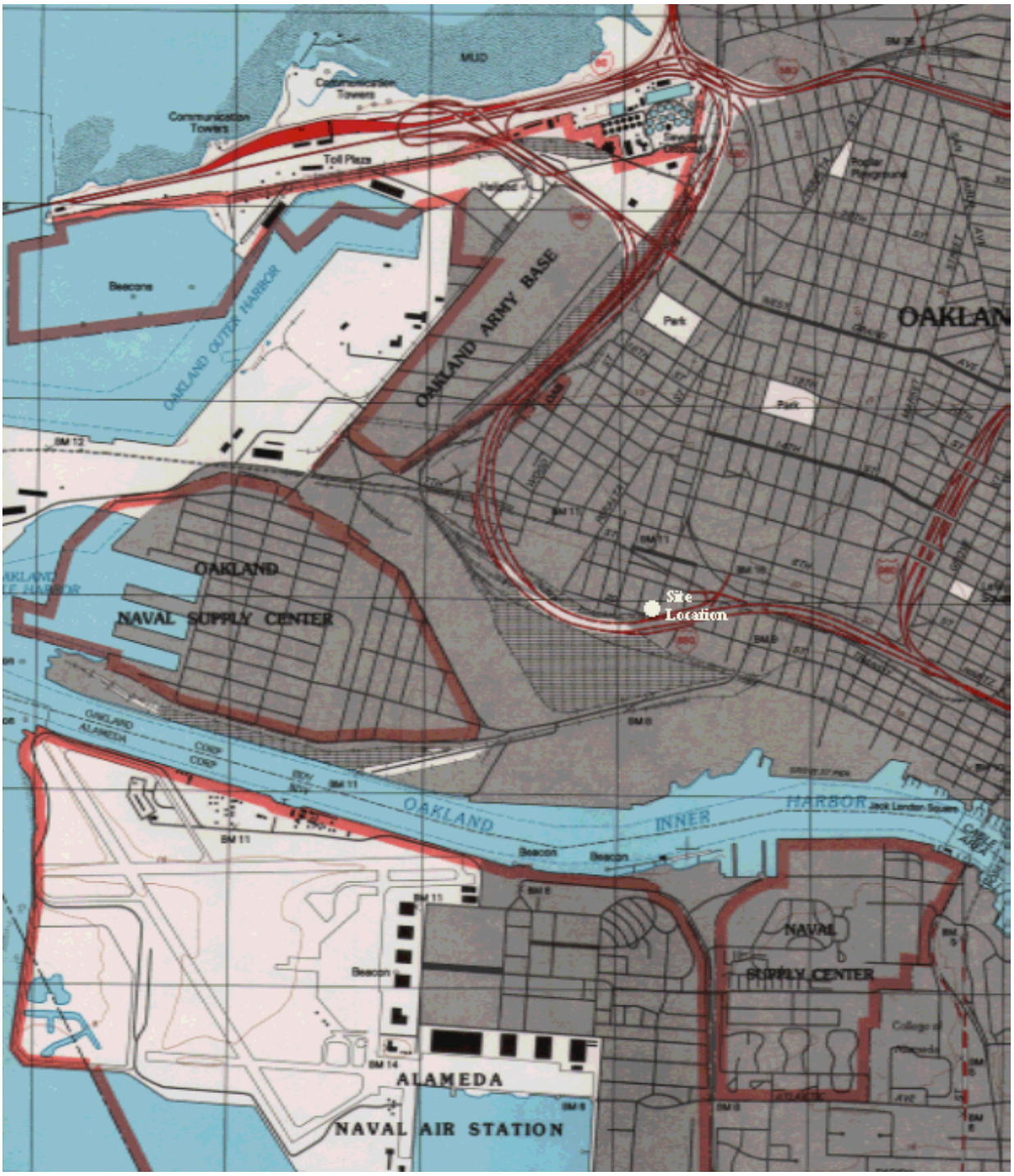
WORKSHEET FOR COMPUTING HRS SITE SCORE

		S	S^2
1.	Ground Water Migration Pathway Score (S_{gw}) (from Table 3-1, line 13)	Not Scored	
2a.	Surface Water Overland/Flood Migration Component (from Table 4-1, line 30)	Not Scored	
2b.	Ground Water to Surface Water Migration Component (from Table 4-25, line 28)	Not Scored	
2c.	Surface Water Migration Pathway Score (S_{sw} Enter the larger of lines 2a and 2b as the pathway score.	Not Scored	
3.	Soil Exposure Pathway Score (S_s (from Table 5-1, line 22)	Not Scored	
4.	Air Migration Pathway Score (S_a) (from Table 6-1, line 12)	100.00	10,000.00
5.	Total of $S_{gw}^2 + S_{sw}^2 + S_s^2 + S_a^2$		10,000.00
6.	**HRS Site Score** Divide the value on line 5 by 4 and take the square root	50.00	

AIR MIGRATION PATHWAY SCORESHEET

Factor Categories and Factors		
Likelihood of Release	Maximum Value	Value Assigned
1. Observed Release	550	550
2. Potential to Release		
2a. Gas Potential to Release	500	__
2b. Particulate Potential to Release	500	__
2c. Potential to Release (higher of lines 2a and 2b)	500	__
3. Likelihood of Release (higher of lines 1 and 2c)	550	550
Waste Characteristics		
4. Toxicity/Mobility	a	10,000
5. Hazardous Waste Quantity	a	100
6. Waste Characteristics	100	32
Targets		
7. Nearest Individual	50	45
8. Population		
8a. Level I Concentrations	b	0
8b. Level II Concentrations	b	618
8c. Potential Contamination	b	98
8d. Population (lines 8a + 8b + 8c)	b	716
9. Resources	5	0
10. Sensitive Environments		
10a. Actual Contamination	c	__
10b. Potential Contamination	c	__
10c. Sensitive Environments (Lines 10a + 10b)	c	0
11. Targets (lines 7 + 8d + 9 + 10c)	b	761
AIR MIGRATION PATHWAY SCORE		
12. Pathway Score (S_a), [(lines 3 x 6 x 11)/82,500][d]	100	100.00

[a]Maximum value applies to waste characteristics category.
[b]Maximum value not applicable.
[c]No specific maximum value applies to factor. However, pathway score based solely on sensitive environments is limited to maximum of 60.
[d]Do not round to nearest integer.



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Dynamic. Dedicated. Driven.

Source: U.S. Geological Survey, 7.5-minute series, Oakland West, CA, Topographic Quadrangle. 1993. North American Datum of 1927. Projection and 1,000-meter grid: Universal Transverse Mercator, Zone 10. Map edited in 1996 (Ref. 3).

N
W E
S

Figure: 1

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2.	U.S. Environmental Protection Agency. Superfund Chemical Data Matrix. June 1996. 56 pages.
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4.	Latitude and Longitude Calculation Worksheet. February 8, 2002. 1 page, 1 map.
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7.	BSK & Associates. Preliminary Subsurface Investigation Results, DC Metals, Inc. July 31, 1996. 19 pages.
8.	Chesick, Kathrine. Emergency Response Files, Re: Emergency Response at AMCO Chemical, 1414 Third Street, Oakland, 94607 on July 26, 1988. July 1988. 2 pages.
9.	McCammon, James. State of California, Department of Health Services, Toxic Substances Control Division, Inspection Report AMCO Chemical Corporation. August 4, 1988. 7 pages.
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11.	Mandel, Robert, U.S. Environmental Protection Agency. DC Metals Site Pollution Report Two. December 6, 1996. 2 pages.
12.	Fynboh, Roxanne, California Industrial Hygiene Services Inc. Results of Ambient Air Monitoring Prior to Construction Activities-An Interim Report. July 15, 1997. Prepared for State of California Department of Transportation. 28 pages.
13.	APEX Environmental Recovery, Inc. Site Investigation Report, Bobo's Junkyard, Third Street and Mandella Parkway, Oakland, California. December 18, 1995. Prepared for California Department of Transportation. 120 pages.
14.	California Industrial Hygiene Services Inc. and URS Corporation. Summary of Ambient Air Monitoring Associated with the Construction of Freeway Footings, draft. August 28, 2000. Prepared for State of California Department of Transportation. 98 pages.
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16.	U.S. Environmental Protection Agency, Region 9 Geographical Information System (GIS) Center. Compilation of Information Regarding Population, Wells, and Endangered/Threatened Species with the Site's 4-mile Target Distance Limit. April 1, 2002. 9 pages.

17. Air monitoring results for EPA Removal Activities. December 5, 1996-July 1, 1997. 22 pages.

18. Gould, Leslie, Director, Planning and Zoning. Letter to Bruni Davila, Project Manager, U.S. Environmental Protection Agency, Re: Former AMCO Chemical Company Site - 3rd Street and Mandela Parkway - Oakland, California. May 8, 2001. 1 page.

19. http://chemfinder.com.cambridgesoft.com. Search Results for Vinyl Chloride, Toluene, and Methylene Chloride. Accessed on February 12, 2002. 20 pages.

20. Wang, P.E., Ph.D, Mu Hao and Lawrence K. Wang, P.E., Ph.D. Conversion Factors For Environmental Engineers and Scientists. Environmental Engineering Department, National Cheng Kung University, Tainan, Taiwan, China and Mechanical Engineering Department, Stevens Institute of Technology, Hoboken, New Jersey. 12 pages.

21. Source Map. Adapted from AMCO Chemical Site (aka DC Metals), Oakland, California, Preliminary Assessment/Site Investigation Report, Figure 6-9.

22. Logbook entries for EPA Removal Activities. December 5, 1996-February 20, 1997. 36 pages.

23. McCleod, Cynthia, START Senior Project Manager, Ecology and Environment, Inc. Memorandum to Project File Regarding On-site Workers. March 7, 2002. 1 page.

24. Amme, Tanya M., HRS Package Preparer, DynCorp Systems and Solutions LLC. Memorandum: Phone Conversation with Cynthia (Cindy) McCleod, START Senior Project Manager for AMCO Chemical Regarding Source Background Sample Locations. March 22, 2002. 2 pages.

25. California Environmental Protection Agency. Work Notification: South Prescott Park and the Union Pacific Vacant Lot Sites, Oakland, CA. August 1999. 1 page.

Site Summary

The AMCO Chemical site (AMCO) is part of a 0.83 acres property at 1414 Third Street in a mixed residential and light industrial area of Oakland, California. The property is bordered on the north by a vacant lot, on the west by residences, on the east by Nelson Mandela Parkway, and on the south by Third Street. Construction playground facilities was due to begin on August 23, 1999 in Prescott Park also located on Third Street. A recently constructed elevated portion of the Interstate-880 (I-880) freeway (the Cypress Freeway Corridor) is located immediately across Third Street from the site. The property (at 1401 Third Street) was historically occupied by Bobo's Junkyard (Ref. 3; 5, p. 8, Figure 6-10; 14, p. 6; 25).

From the 1960s to 1989, the AMCO property was occupied by AMCO Chemical Company. AMCO operated a chemical distribution facility that included a warehouse, railroad spur, aboveground tanks, underground tanks, and drums used to transfer and store raw materials (Ref. 5, p. 8). In July 1988, the Oakland Fire Department observed "leaking/rotting drums" on the property (Ref. 8, p. 1). A subsequent emergency response investigation by Alameda County and the U.S. Coast Guard revealed greater than 100 full and empty 5- and 55- gallon weathered drums in an open area behind AMCO Chemical's main building. Stenciled labels on the drums indicated that the contents included acetone; 1,1,1-trichloroethane (1,1,1-TCA); methyl ethyl ketone; and dry-cleaning solvent (Ref. 8, p. 1). From 1989 to November 1998, DC Metals operated a scrap metal yard on the site (Ref. 5, p. 8). Cable Moore, Inc. currently uses the site for cable storage. Structures remaining on site include an office building, warehouse, and two small storage buildings (Ref. 5, p. 8 and Figure 3-2).

The Loma Prieta earthquake destroyed a section of the I-880 freeway in October 1989. The State of California Department of Transportation (Caltrans) designed the replacement for this section of freeway on a new alignment that circumvents West Oakland and passes over the 1401 Third Street property immediately to the south of the AMCO site (Ref. 3; 5, p. 8; 14, p. 6). In June 1995, a construction crew discovered vinyl chloride at the intersection of Third Street and Nelson Mandela Parkway, while excavating a trench needed to relocate an underground electrical line in preparation for the freeway project (Ref. 14, p. 6). Subsequent subsurface investigation by Caltrans, DC Metals, and EPA revealed the presence of volatile organic compounds (VOCs), including vinyl chloride, in soil, soil gas, and shallow groundwater at the AMCO site, beneath Third Street, and at the 1401 Third Street property (former Bobo's Junkyard) (Refs. 5; 7; 13). Ground water is first encountered between four and six feet below ground surface (bgs) in this area (Ref. 13, p. 14). In order to minimize the potential for a release of VOCs to ambient air during freeway construction at the 1401 Third Street property, Caltrans redesigned the footings to eliminate the need for structural excavation (Ref. 14, pp. 6-7). The footings were installed on December 23, 24, and 26, 1996 (Ref. 14, p. 11).

On December 5, 1996, the EPA Emergency Response Office initiated a removal action at the AMCO site that involved the construction of a ground water and soil vapor extraction (SVE) treatment system. The EPA treatment system collection trench was excavated from December 5 through December 20, 1996. By December 23, 1996, the trench had been lined with a silt curtain, filled with gravel, and covered with a tarp. Cement was poured to permanently cover the trench on January 10, 1997 (Ref. 5, p. 15; 17, p. 7; 22, pp. 22, 23, 33). The treatment system operated from January 1997 through July 1998 and extracted approximately 7,000 pounds of VOCs, approximately 40 pounds of which were vinyl chloride. Operation of the system ceased in July 1998, due to community concern over the potential for a release of dioxins from the thermal oxidation unit (Ref. 5, p. 16). On December 5 and 14, 1996, during construction of the treatment system collection trench, the EPA On-Scene Coordinator observed shimmering vapors emanating from the open trench. SUMMA canister sampling indicated the presence of vinyl chloride; methylene chloride; 1,1,1-TCA; and trichloroethene (TCE) in the immediate area of the trench. In addition, one SUMMA canister sample collected from in front of a residence adjacent to the site contained TCE (Ref. 5, p. 16).

The EPA conducted several sampling events on and adjacent to the AMCO site between 1997 and 2000. VOCs continued to be detected in soil, soil gas, and ground water on site (Ref. 5, pp. 14-25). In September 1999, SUMMA canister samples were collected from the crawl spaces of three residences located adjacent to the site. Vinyl chloride was detected in the three crawl spaces at low levels (0.02 to 0.045 parts per billion by volume (ppbv)) (Ref, 5, pp. 19-20). During a subsequent crawl space sampling event in April 2000, vinyl chloride was not detected (Ref. 5, pp. 21-25).

The area of West Oakland in which the AMCO site is located has received intense public interest since 1996, when the State of California Department of Toxic Substances Control held a public hearing after the June 1995 trenching incident and associated sampling activities. Individual community members; community and environmental

groups; and federal, state, and local elected officials have expressed interest in the investigation at the AMCO site and the former Bobo's Junkyard property (Ref. 5, pp. 26-27).

2.2 SOURCE CHARACTERIZATION

2.2.1 SOURCE IDENTIFICATION

Name of source: Contaminated Soil Number of source: 1

Source Type: Contaminated Soil

Description and Location of Source:
Source 1 consists of an area of contaminated soil that is located around the center of the AMCO Chemical property at 1414 Third Street and extends to the corner of a residential property to the west of the AMCO property (Ref. 21).

In July 1988, the Oakland Fire Department (OFD) reported leaking drums at the AMCO property to the California Office of Emergency Services. Greater than 100 full and empty 5- and 55- gallon drums were found in an open area behind AMCO's main building. Stenciled labels on the drums indicated that some of the contents were acetone, 1,1,1-trichloroethane (1,1,1-TCA), methanol, ethylene glycol and methyl ethyl ketone (Ref. 8, p. 1). This spill was also reported to the State of California Department of Health Toxic Substances Control Division. During a subsequent inspection of the AMCO property, inspectors observed several materials leaking and/or already leaked on the ground, including: an "oily liquid identified by the property owner as 'transformer oil' . . . . a powdery solid . . . leaking through holes in the sides [of drums] . . . . [and an] orange, viscous semi-solid, which appeared to be either a soap or a grease, that was flowing onto the ground from a hole in a drum" (Ref. 9, pp. 1 and 3).

Two previous sampling events have occurred at the site. In March 1986, AMCO hired a contractor to conduct a site investigation and soil sampling in the outside yard area of the AMCO property. Six samples, collected at six locations, revealed a TCA concentration of 25,500 parts per billion (ppb) and a 1,1-dichloroethane concentration of 2,100 ppb (Ref. 6, pp. 1, 3, 5 and 6). In July 1996, DC Metals, the next owners of the property, had a preliminary subsurface investigation conducted. The four soil samples collected indicated hits of vinyl chloride (1,000 microgram per kilogram (µg/kg)), 1,1-dichloroethane (5,000 µg/kg), 1,2-dichlorobenzene (16,000 µg/kg), and cis-1,2-dichloroethene (22,000 µg/kg) (Ref. 7, pp. 1, 3, 5, and 15).

In December 1996, U.S. EPA Region 9 Emergency Response Office (ERO) breached the concrete that covers the site and began excavation for the construction of a groundwater and soil vapor extraction (SVC) treatment system at the AMCO site (Ref. 5, p. 15). During excavation, an 1,800-gallon underground storage tank (UST) was discovered under the sidewalk on Third Street. The UST contained oily water and sludge which was removed along with a small volume of petroleum contaminated soil (Refs 5, p 15; 10, p. 39). Evidence also indicated that two other USTs were located at this site, but they have since been removed (Ref. 11, pp. 1-2).

To support a preliminary assessment/site investigation (PA/SI), EPA commenced investigations at the site starting in December 1998 and continuing through April 2000. During the September 1999 investigation, EPA collected a total of 49 soil samples, including seven duplicate and four background samples. Samples were obtained from 16 soil borings on and near the site. In particular, the background samples were collected across Mandela Parkway from the site (Ref. 5, p. 20 and Table 6-9; 24). Samples were collected from intervals up to a maximum depth of 10 feet bgs using a Geoprobe™ direct-push sampler. The boring samples were divided into three intervals for analysis: 1-2 feet, 2-5 feet, and 3-10 feet; however, only the first interval (1-2 feet) was used to document contamination in this source. Samples were analyzed for volatile organic compounds (VOCs) by U.S. EPA method 5035/8260B (Ref. 5, p. 20, Table 6-9).

2.2.2 HAZARDOUS SUBSTANCES ASSOCIATED WITH THE SOURCE

- Source Samples:
The following table shows the results of the September 1999 EPA PA/SI soil investigation.

Sample ID	Sample Type	Date	Hazardous Substance	Hazardous Substance Concentration (µg/kg)	Quantitation Limit (µg/kg)	Reference
S-60-1	Soil	9/15/1999	1,2-Dichlorobenzene	9.3 J*	5.0	5, pp. 67, 422
			1,1-Dichloroethane	47 J	5.0	5, pp. 67, 422
			cis-1,2-Dichloroethene	16 J	5.0	5, pp. 67, 423
			4-Isopropyltoluene	5.5 J	5.0	5, pp. 67, 423
			Trichloroethene	18 J	5.0	5, pp. 67, 424
			1,2,4-Trimethylbenzene	13 J	5.0	5, pp. 67, 424
S-61-1	Soil	9/15/1999	1,1-Dichloroethane	53 J	5.0	5, pp. 67, 431
			cis-1,2-Dichloroethene	17 J	5.0	5, pp. 67, 432
			1,1,1-Trichloroethane	6.7 J	5.0	5, pp. 67, 433
			Trichloroethene	19 J	5.0	5, pp. 67, 433
S-63-1	Soil	9/15/1999	sec-Butylbenzene	27000	10000	5, pp. 67, 437
			1,2-Dichlorobenzene	27000	10000	5, pp. 67, 437
			1,1-Dichloroethane	25000	10000	5, pp. 67, 437
			cis-1,2-Dichloroethene	580000	10000	5, pp. 67, 438
			Isopropylbenzene	21000	10000	5, pp. 67, 438
			4-Isopropyltoluene	79000	10000	5, pp. 67, 438
			Methyl Isobutyl Ketone	120000	10000	5, pp. 67, 438
			Naphthalene	61000	10000	5, pp. 67, 438
			n-Propylbenzene	52000	10000	5, pp. 67, 438
			Tetrachloroethene	31000	10000	5, pp. 67, 438

* J qualifier generally means the associated numerical value is an estimated quantity because the reported concentrations were less than the required practical quantitation limits or because quality control criteria were not met. Specifically, data in samples S-60-1 and S-61-1 were qualified because of low surrogate recoveries, giving the data a low bias (Ref. 5, pp. 409, 414).

Sample ID	Sample Type	Date	Hazardous Substance	Hazardous Substance Concentration (µg/kg)	Quantitation Limit (µg/kg)	Reference
			Trichloroethene	350000	10000	5, pp. 67, 439
			1,2,4-Trimethylbenzene	320000	10000	5, pp. 67, 439
			1,3,5-Trimethylbenzene	110000	10000	5, pp. 67, 439
S-64-1	Soil	9/13/1999	sec-Butylbenzene	310	200	5, pp. 67, 445
			1,1-Dichloroethane	250	200	5, pp. 67, 445
			Isopropylbenzene	410	200	5, pp. 67, 446
			4-Isopropyltoluene	250	200	5, pp. 67, 446
			Naphthalene	720	200	5, pp. 67, 446
			n-Propylbenzene	510	200	5, pp. 67, 446
			1,2,4-Trimethylbenzene	1300	200	5, pp. 67, 447
			1,3,5-Trimethylbenzene	480	200	5, pp. 67, 447
S-65-1	Soil	9/13/1999	sec-Butylbenzene	370	200	5, pp. 67, 454
			1,1-Dichloroethane	200	200	5, pp. 67, 454
			Isopropylbenzene	450	200	5, pp. 67, 455
			n-Propylbenzene	740	200	5, pp. 67, 455
			1,2,4-Trimethylbenzene	1200	200	5, pp. 67, 456
			1,3,5-Trimethylbenzene	270	200	5, pp. 67, 456
S-66-1	Soil	9/15/1999	Chloroethane	140	5.0	5, pp. 67, 460
			1,1-Dichloroethane	8	5.0	5, pp. 67, 460
			1,2-Dichloroethane	58	5.0	5, pp. 67, 461
			Vinyl Chloride	7.9	5.0	5, pp. 67, 462
S-68-1	Soil	9/13/1999	sec-Butylbenzene	2600	200	5, pp. 68, 481
			1,2-Dichlorobenzene	4100	200	5, pp. 68, 481
			1,3-Dichlorobenzene	440	200	5, pp. 68, 481
			1,4-Dichlorobenzene	720	200	5, pp. 68, 481
			Isopropylbenzene	2100	200	5, pp. 68, 482

Sample ID	Sample Type	Date	Hazardous Substance	Hazardous Substance Concentration (µg/kg)	Quantitation Limit (µg/kg)	Reference
			4-Isopropyltoluene	3800	200	5, pp. 68, 482
			Naphthalene	20000	200	5, pp. 68, 482
			n-Propylbenzene	6300	200	5, pp. 68, 482
			Tetrachloroethene	530	200	5, pp. 68, 482
			1,2,3-Trichlorobenzene	1200	200	5, pp. 68, 482
			1,2,4-Trichlorobenzene	5000	200	5, pp. 68, 482
			1,2,4-Trimethylbenzene	52000	200	5, pp. 68, 483
			1,3,5-Trimethylbenzene	20000	200	5, pp. 68, 483
S-69-1	Soil	9/9/1999	sec-Butylbenzene	15000	10000	5, pp. 68, 484
			1,2-Dichlorobenzene	49000	10000	5, pp. 68, 484
			1,1-Dichloroethane	13000	10000	5, pp. 68, 484
			cis-1,2-Dichloroethene	660000	10000	5, pp. 68, 485
			Ethylbenzene	71000	10000	5, pp. 68, 485
			Isopropylbenzene	12000	10000	5, pp. 68, 485
			Methyl Isobutyl Ketone	16000	10000	5, pp. 68, 485
			Naphthalene	65000	10000	5, pp. 68, 485
			n-Propylbenzene	31000	10000	5, pp. 68, 485
			Tetrachloroethene	100000	10000	5, pp. 68, 485
			Trichloroethene	200000	10000	5, pp. 68, 486
			1,2,4-Trimethylbenzene	180000	10000	5, pp. 68, 486
			1,3,5-Trimethylbenzene	69000	10000	5, pp. 68, 486
S-70-1	Soil	9/15/1999	sec-Butylbenzene	340	200	5, pp. 68, 493
			1,2-Dichlorobenzene	5600	200	5, pp. 68, 493
			1,4-Dichlorobenzene	1000	200	5, pp. 68, 493
			Isopropylbenzene	290	200	5, pp. 68, 494
			4-Isopropyltoluene	1200	200	5, pp. 68, 494

Sample ID	Sample Type	Date	Hazardous Substance	Hazardous Substance Concentration (µg/kg)	Quantitation Limit (µg/kg)	Reference
			Naphthalene	6400	200	5, pp. 68, 494
			n-Propylbenzene	950	200	5, pp. 68, 494
			1,2,4-Trimethylbenzene	4700	200	5, pp. 68, 495
			1,3,5-Trimethylbenzene	1700	200	5, pp. 68, 495
S-71-1	Soil	9/15/1999	sec-Butylbenzene	6400	1000	5, pp. 68, 502
			1,2-Dichlorobenzene	88000	1000	5, pp. 68, 502
			1,4-Dichlorobenzene	18000	1000	5, pp. 68, 502
			Isopropylbenzene	5800	1000	5, pp. 68, 503
			4-Isopropyltoluene	23000	1000	5, pp. 68, 503
			Naphthalene	110000	1000	5, pp. 68, 503
			n-Propylbenzene	19000	1000	5, pp. 68, 503
			1,2,4-Trichlorobenzene	2900	1000	5, pp. 68, 503
			1,2,4-Trimethylbenzene	95000	1000	5, pp. 68, 504
			1,3,5-Trimethylbenzene	37000	1000	5, pp. 68, 504
S-72-1	Soil	9/13/1999	sec-Butylbenzene	4500	200	5, pp. 68, 508
			Chlorobenzene	310	200	5, pp. 68, 508
			1,2-Dichlorobenzene	12000	200	5, pp. 68, 508
			1,4-Dichlorobenzene	1800	200	5, pp. 68, 508
			1,1-Dichloroethane	2100	200	5, pp. 68, 508
			cis-1,2-Dichloroethene	28000	200	5, pp. 68, 509
			Isopropylbenzene	3300	200	5, pp. 68, 509
			4-Isopropyltoluene	6600	200	5, pp. 68, 509
			Naphthalene	46000	200	5, pp. 68, 509
			n-Propylbenzene	8700	200	5, pp. 68, 509
			Tetrachloroethene	280	200	5, pp. 68, 509
			1,2,4-Trimethylbenzene	51000	200	5, pp. 68, 510

Sample ID	Sample Type	Date	Hazardous Substance	Hazardous Substance Concentration (µg/kg)	Quantitation Limit (µg/kg)	Reference
			1,3,5-Trimethylbenzene	19000	200	5, pp. 68, 510
			Vinyl Chloride	5100	200	5, pp. 68, 510
S-74-1	Soil	9/15/1999	sec-Butylbenzene	860	250	5, pp. 68, 520
			Isopropylbenzene	3400	250	5, pp. 68, 521
			4-Isopropyltoluene	810	250	5, pp. 68, 521
			Naphthalene	880	250	5, pp. 68, 521
			n-Propylbenzene	12000	250	5, pp. 68, 521
			1,2,4-Trimethylbenzene	45000	250	5, pp. 68, 522
			1,3,5-Trimethylbenzene	10000	250	5, pp. 68, 522
S-75-1	Soil	9/13/1999	sec-Butylbenzene	1400	200	5, pp. 69, 523
			Chlorobenzene	2700	200	5, pp. 69, 523
			1,2-Dichlorobenzene	6600	200	5, pp. 69, 523
			1,4-Dichlorobenzene	2300	200	5, pp. 69, 523
			1,1-Dichloroethane	8300	200	5, pp. 69, 523
			cis-1,2-Dichloroethene	14000	200	5, pp. 69, 524
			Isopropylbenzene	2000	200	5, pp. 69, 524
			4-Isopropyltoluene	64000	200	5, pp. 69, 524
			Methyl Isobutyl Ketone	300	200	5, pp. 69, 524
			Naphthalene	12000	200	5, pp. 69, 524
			n-Propylbenzene	7300	200	5, pp. 69, 524
			Tetrachloroethene	570	200	5, pp. 69, 524
			1,1,1-Trichloroethane	4800	200	5, pp. 69, 525
			Trichloroethene	1100	200	5, pp. 69, 525
			1,2,4-Trimethylbenzene	41000	200	5, pp. 69, 525
			1,3,5-Trimethylbenzene	19000	200	5, pp. 69, 525
S-76-1	Soil	9/9/1999	Chlorobenzene	27000	10000	5, pp. 69, 526

Sample ID	Sample Type	Date	Hazardous Substance	Hazardous Substance Concentration (µg/kg)	Quantitation Limit (µg/kg)	Reference
			1,2-Dichlorobenzene	170000	10000	5, pp. 69, 526
			Naphthalene	40000	10000	5, pp. 69, 527
			1,2,3-Trichlorobenzene	14000	10000	5, pp. 69, 527
			1,2,4-Trichlorobenzene	44000	10000	5, pp. 69, 527
			1,2,4-Trimethylbenzene	57000	10000	5, pp. 69, 528
			1,3,5-Trimethylbenzene	21000	10000	5, pp. 69, 528
S-77-1	Soil	9/15/1999	Chlorobenzene	120000	1000	5, pp. 69, 529
			1,2-Dichlorobenzene	6700	1000	5, pp. 69, 529
			1,4-Dichlorobenzene	3000	1000	5, pp. 69, 529
			Isopropylbenzene	3100	1000	5, pp. 69, 530
			4-Isopropyltoluene	2600	1000	5, pp. 69, 530
			Naphthalene	17000	1000	5, pp. 69, 530
			n-Propylbenzene	5000	1000	5, pp. 69, 530
			1,2,4-Trimethylbenzene	17000	1000	5, pp. 69, 531
			1,3,5-Trimethylbenzene	6300	1000	5, pp. 69, 531
S-78-1	Soil	9/13/1999	sec-Butylbenzene	550	200	5, pp. 69, 538
			Chlorobenzene	840	200	5, pp. 69, 538
			1,2-Dichlorobenzene	100000	200	5, pp. 69, 538
			1,3-Dichlorobenzene	4900	200	5, pp. 69, 538
			1,4-Dichlorobenzene	20000	200	5, pp. 69, 538
			cis-1,2-Dichloroethene	210	200	5, pp. 69, 539
			4-Isopropyltoluene	940	200	5, pp. 69, 539
			Naphthalene	4800	200	5, pp. 69, 539
			n-Propylbenzene	510	200	5, pp. 69, 539
			1,2,3-Trichlorobenzene	500	200	5, pp. 69, 539
			1,2,4-Trichlorobenzene	2700	200	5, pp. 69, 539

Sample ID	Sample Type	Date	Hazardous Substance	Hazardous Substance Concentration (µg/kg)	Quantitation Limit (µg/kg)	Reference
			Trichloroethene	220	200	5, pp. 69, 540
			1,2,4-Trimethylbenzene	4600	200	5, pp. 69, 540
			1,3,5-Trimethylbenzene	1700	200	5, pp. 69, 540
S-79-1	Soil	9/9/199	sec-Butylbenzene	6200	1000	5, pp. 69, 547
			n-Butylbenzene	7200	1000	5, p. 547
			Isopropylbenzene	3700	1000	5, pp. 69, 548
			4-Isopropyltoluene	1800	1000	5, pp. 69, 548
			Naphthalene	2600	1000	5, pp. 69, 548
			n-Propylbenzene	10000	1000	5, pp. 69, 548
			Tetrachloroethene	1800	1000	5, pp. 69, 548
			1,2,4-Trimethylbenzene	4400	1000	5, pp. 69, 549

- Background Samples:
The following table shows the results of the September 1999 EPA PA/SI soil investigation.

Sample ID	Sample Type	Date	Hazardous Substance	Hazardous Substance Concentration (µg/kg)	Quantitation Limit (µg/kg)	Reference
S-81-1	Soil	9/17/1999	Butylbenzene, sec-	ND	5	5, pp. 69, 556
			Butylbenzene, n-	ND	5	5, p. 556
			Chloroethane	ND	5	5, pp. 69, 556
			Dichlorobenzene, 1,2-	ND	5	5, pp. 69, 556
			Dichlorobenzene, 1,3-	ND	5	5, pp. 69, 556
			Dichlorobenzene, 1,4-	ND	5	5, pp. 69, 556
			Dichloroethane, 1,1-	ND	5	5, pp. 69, 556
			Dichloroethane, 1,2-	ND	5	5, pp. 69, 557
			Dichloroethane, cis-1,2-	ND	5	5, pp. 69, 557
			Isopropylbenzene	ND	5	5, pp. 69, 557
			Isopropyltoluene, 4-	ND	5	5, pp. 69, 557

Sample ID	Sample Type	Date	Hazardous Substance	Hazardous Substance Concentration (µg/kg)	Quantitation Limit (µg/kg)	Reference
			Methyl Isobutyl Ketone	ND	5	5, pp. 69, 557
			Naphthalene	ND	5	5, pp. 69, 557
			Propylbenzene, n-	ND	5	5, pp. 69, 557
			Tetrachloroethene	ND	5	5, pp. 69, 557
			Trichlorobenzene, 1,2,3-	ND	5	5, pp. 69, 557
			Trichlorobenzene, 1,2,4-	ND	5	5, pp. 69, 557
			Trichloroethane, 1,1,1-	ND	5	5, pp. 69, 558
			Trichloroethene	ND	5	5, pp. 69, 558
			Trimethylbenzene, 1,2,4-	ND	5	5, pp. 69, 558
			Trimethylbenzene, 1,3,5-	ND	5	5, pp. 69, 558
			Vinyl Chloride	ND	5	5, pp. 69, 558
S-82-1	Soil	9/16/1999	Butylbenzene, sec-	ND	5	5, pp. 69, 559
			Butylbenzene, n-	ND	5	5, p. 559
			Chloroethane	ND	5	5, pp. 69, 559
			Dichlorobenzene, 1,2-	ND	5	5, pp. 69, 559
			Dichlorobenzene, 1,3-	ND	5	5, pp. 69, 559
			Dichlorobenzene, 1,4-	ND	5	5, pp. 69, 559
			Dichloroethane, 1,1-	ND	5	5, pp. 69, 559
			Dichloroethane, 1,2-	ND	5	5, pp. 69, 560
			Dichloroethane, cis-1,2-	ND	5	5, pp. 69, 560
			Isopropylbenzene	ND	5	5, pp. 69, 560
			Isopropyltoluene, 4-	ND	5	5, pp. 69, 560
			Methyl Isobutyl Ketone	ND	5	5, pp. 69, 560
			Naphthalene	ND	5	5, pp. 69, 560
			Propylbenzene, n-	ND	5	5, pp. 69, 560

Sample ID	Sample Type	Date	Hazardous Substance	Hazardous Substance Concentration (µg/kg)	Quantitation Limit (µg/kg)	Reference
			Tetrachloroethene	ND	5	5, pp. 69, 560
			Trichlorobenzene, 1,2,3-	ND	5	5, pp. 69, 560
			Trichlorobenzene, 1,2,4-	ND	5	5, pp. 69, 560
			Trichloroethane, 1,1,1-	ND	5	5, pp. 69, 561
			Trichloroethene	ND	5	5, pp. 69, 561
			Trimethylbenzene, 1,2,4-	ND	5	5, pp. 69, 561
			Trimethylbenzene, 1,3,5-	ND	5	5, pp. 69, 561
			Vinyl Chloride	ND	5	5, pp. 69, 561

2.2.3 HAZARDOUS SUBSTANCES AVAILABLE TO A PATHWAY

Containment Description	Containment Factor Value	Ref.
Gas release to air: During excavation and construction of the EPA treatment system collection trench at the site, the concrete that covers the site, was breached for approximately one month from December 5, 1996 to January 8, 1997. During this time, vapor was observed entering the air. Air sampling conducted at the excavation perimeter during two observed release events documented the presence of vinyl chloride, demonstrating evidence of a biogas release. In addition, based on this one month period, the contaminated soil did not have a cover that was essentially impermeable, regularly inspected, and maintained. Furthermore, although not considered an air release under the HRS, VOCs were detected in crawl spaces of residences near the site in 1999, showing that the pavement/cement is not preventing atmospheric releases of VOCs.	10	1, Section 6.1.2.1.1, Table 6-3; 5, pp. 15-16, 19, 20

2.2.4 HAZARDOUS WASTE QUANTITY

2.4.2.1.1. Hazardous Constituent Quantity

Hazardous Constituent Quantity Assigned Value: NS

2.4.2.1.2. Hazardous Wastestream Quantity

Hazardous Wastestream Quantity Assigned Value: NS

2.4.2.1.3. Volume

Volume Assigned Value: 0

2.4.2.1.4. Area

Description
An exact area of this source was not available at the time of HRS package preparation. However, the samples S-60-1, S-61-1, S-63-1, S-64-1, S-65-1, S-66-1, S-68-1, S-69-1, S-70-1, S-71-1, S-72-1, S-74-1, S-75-1, S-76-1, S-77-1, S-78-1, and S-79-1 document contaminated soil at the AMCO Chemical site. Therefore, an area value of >0 has been assigned (Ref. 5, Figure 6-9; 21; Section 2.2.2 of this HRS documentation record).

Source Type	Units (ft^2)	References
Contaminated Soil	>0	5, Figure 6-9; 21; Section 2.2.2 of this HRS documentation record

Sum (ft^2): >0
Equation for Assigning Value (Ref. 1, Table 2-5): >0/34,000 = >0

Area Assigned Value: >0

2.4.2.1.5. Source Hazardous Waste Quantity Value

Highest assigned value assigned from Table 2-5: >0
(Ref. 1, Table 2-5)

SUMMARY OF SOURCE DESCRIPTIONS

Source No.	Source Hazardous Waste Quantity Value	Source Hazardous Constituent Quantity Complete? (Y/N)	Containment Factor Value by Pathway				
			Ground Water (GW) (HRS, Table 3-2)	Surface Water (SW)		Air	
				Overland/flood (HRS, Table 4-2)	GW to SW (HRS, Table 3-2)	Gas (HRS, Table 6-3)	Particulate (HRS, Table 6-9)
1	>0	N	NS	NS	NS	10	NS

Description of Other Potential Sources

Occidental Chemical Company/Bobo's Junkyard: From 1966 to 1976, the property at 1401 Third Street, Oakland, CA, directly across the street from the AMCO site, was owned by Occidental Chemical Company and occupied by Best Fertilizers, a company owned by Occidental. In 1976, Southern Pacific purchased the property and leased it to John Bobo for his automobile dismantling business (Ref. 12, p. 8). Soils and ground water at the Bobo's Junkyard site have been found to contain various chemicals and metals, including petroleum hydrocarbons, solvents such as those found in degreasers and parts cleaners, and lead (Ref. 13, p. 22-25). Although it appears that Bobo's Junkyard may be partially contributing to contamination in the area, reports of leaking acetone, 1,1,1-trichloroethane (TCA), methanol, ethylene glycol and methyl ethyl ketone drums at the AMCO property indicate that at least a portion of the contamination in the release is attributed to the AMCO Chemical site (Ref. 8, p.1).

6.0 AIR MIGRATION PATHWAY

6.1.1OBSERVED RELEASE

Direct Observation

- Basis for Direct Observation:

EPA-ERO initiated a removal action to mitigate subsurface migration of vinyl chloride. Construction of a ground water and SVE treatment system began in December 1996, and the treatment began operating in January 1997. During excavation of the treatment trench, vapor was observed entering the air on two occasions (December 5 and 14, 1996). Air sampling conducted at the excavation perimeter during the two observed release events (December 5 and 14, 1996) documented the presence of vinyl chloride at concentrations up to 120 ppbv in instantaneous ("grab") samples and up to 19 ppbv in 6-hour time-integrated samples an 8-hour SUMMA canister. Vinyl chloride precursor compounds TCE and PCE were documented at concentrations up to 9,600 and 420 ppbv respectively in grab samples and up to 1,600 and 48 ppbv respectively in time-integrated samples. In addition, several other substances were documented in these releases (Ref. 5, pp. 15-16; 22, pp. 2 and 13).

- Hazardous Substances in Release:

Hazardous Substance	Evidence(Air Sample #s)	Reference
Methylene Chloride	SYL517 and SYL518	17, pp. 5
Tetrachloroethene (PCE)	SYL514 and SYL518	17, pp. 5, 9
Trichloroethane, 1,1,1-	SYL517and SYL518	17, pp. 5
Trichloroethene (TCE)*	SYL514, SYL514 (duplicate), SYL515, SYL 516, SYL 517, and SYL518	17, pp. 5, 9
Vinyl Chloride	SYL514, SYL514 (duplicate), SYL 515	17, pp. 9

* Trichloroethene is called trichloroethylene in Reference 17.

Chemical Analysis

- Background Concentrations:

In November 1996, CIH Services, a contractor for Caltrans, conducted ambient air monitoring prior to construction activities, at 1401 Third Street and across from the AMCO site, for the new I-880 freeway section. The background data obtained was used to compare with data collected from subsequent monitoring activities performed during and after the construction phase (Ref. 12, p. 8).

Three sampling stations were maintained throughout the five day sampling period. Sampling was performed continuously to collect three 8-hour integrated samples per 24-hour period for a total of 45 samples. The three 8-hour sampling intervals were 0700-1500, 1500-2300, and 2300-0700. According to historical weather data, the predominant wind during November and December was from the west-northwest. This was verified by the metrology station maintained at the site to collect data during the project. EPA Compendium Method TO-14 was the primary method used for sampling and analysis of VOCs. Canisters and other components of the sampling system were cleaned/certified per the procedures outlined by the method. Analysis was performed by gas chromatography/mass spectrometry (GC/MS) (Ref. 12, p. 10).

Although the background concentrations are documented from a different sampling event than the release samples, the values used are representative background concentrations, are from comparable samples, and are conservative concentrations. Both the background and release samples were collected and analyzed using the EPA Compendium

Method TO-14 (Ref. 12, p. 10; 17, p. 5). The background concentration came from 8-hour integrated samples, and the release samples came from 6-hour integrated samples (Ref. 5, pp. 15-16; 12, p. 10; 17, pp. 1 and 8). As the background samples had more time for substances to accumulate, concentrations are expected to be higher in the background samples. Therefore any release concentration that documents an observed release would be a conservative indication of an observed release. In addition, the highest, thus most conservative, background concentration for each contaminant was selected to be compared to the release samples.

Further, the Caltrans project samples were collected over eight-hour periods to be comparable to the 1996-97 California Air Resources Board (CARB) data for their five Bay Area sites - Concord, Fremont, Richmond, San Francisco, and San Jose (Ref. 14, pp. 18). All but two of the contaminants of concern at this site (vinyl chloride and 1,1,1-trichloroethane) are represented in the CARB data. Overall, the mean concentration in 1996 of each of the contaminants indicates that the regional concentrations for these contaminants are significantly lower than the site specific background concentrations (Ref. 14, pp. 93-97). Therefore, the site specific background concentrations are conservative values to use for documenting an observed release.

Sample ID	Date	Time	Reference
12943	11/26/1996	2300-0700	12, pp. 20, 21, 25
9423	11/24/1996	0700-1500	12, pp. 20, 23
12006	11/27/1996	0700-1500	12, pp. 20, 22, 24
13659	11/26/1996	2300-0700	12, pp. 20, 26

Sample ID	Hazardous Substance	Concentration (ppbv)	Limit of Detection	Reference
12006	Methylene Chloride	2.1	0.38	12, pp. 13, 22; 14, p. 41
	Trichloroethene	2.6	0.19	12, pp. 13, 24; 14, p. 41
12943	Vinyl Chloride	0.13	0.019	12, pp. 13, 21; 14, p. 41
13659	Tetrachloroethene	0.82	0.19	12, pp. 13, 26; 14, p. 41
9423	Trichloroethane, 1,1,1-	0.39	0.19	12, pp. 13, 23; 14, p. 41

Notes: The limit of detection (LOD) was provided as combined range of all the samples in the study for each substance. To be conservative, the highest LOD was used for comparison purposes.

Mean 1996 CARB Data for Five Bay Area Locations (ppb)

Substance	Concord	Fremont	Richmond	San Francisco	San Jose	Reference
Methylene Chloride	0.555	0.50	0.623	0.661	0.545	14, pp. 93-97
Tetrachloroethene	0.082	0.068	0.03	0.084	0.069	14, pp. 93-97
Trichloroethane, 1,1,1-	–	–	–	–	–	14, pp. 93-97
Trichloroethene	0.01	0.011	0.017	0.029	0.024	14, pp. 93-97
Vinyl Chloride	–	–	–	–	–	14, pp. 93-97

- Contaminated Samples:

Throughout excavation and construction activities for the EPA ground water and SVE treatment system from December 5, 1996 through January 8, 1997, the START conducted air monitoring and sampling at the site perimeter and at the nearest residence (1428 Third Street). On December 5 and 14, 1996, vapor was observed entering the air from the excavation of the treatment trench (Ref. 5, pp. 15-16). On December 5, one 6-hour time-integrated sample from an 8-hour SUMMA canister (SYL514) and one duplicate sample was collected from a location along the east side of the trench (5, pp. 15-16; 17, pp. 8-9, 22; 22, p. 2). The sample was analyzed for VOCs using EPA Compendium Method TO-14 (EPA Method 600/4-84-041). Results indicated the presence of vinyl chloride at a concentration of 19 ppbv and TCE at a concentration of 57 ppbv (Ref. 17, p. 9). On December 14, one 6-hour time-integrated sample from an 8-hour SUMMA canister (SYL517) was collected from another location along the side of the trench and one 6-hour time-integrated sample from an 8-hour SUMMA canister (SYL516) was collected from a location in front of the nearest residence, which is located adjacent to the site. The samples were analyzed for VOCs using EPA Compendium Method TO-14 (EPA 600/4-84-041) (Ref. 5, pp. 15-16; 17, pp. 1, 4, 5, and 22; 22, pp. 13. Results indicate the presence of methylene chloride (61 ppbv) and 1,1,1-TCA (190 ppbv) in the sample collected next to the trench. Results indicated the presence of TCE (14 ppbv) in the sample collected next to the residence (Ref. 17, p. 5). Although none of the 1996 analytical data have been validated by a third party, the laboratory data sheets indicated that the surrogate recoveries were well within an acceptable range (ranging from 91 to 116 percent), no analytes were detected in the system blanks, the field duplicate results for the December 5 sampling event appear to be comparable, and no hazardous substances in the calibration of the analytical system exceeded the relative standard deviation or relative percent difference (Ref. 17, pp. 4, 5, 9).

Sample ID	Date	Time	Reference
SYL514	12/05/1996	1030	17, p. 8
SYL514 (duplicate)	12/05/1996	1030	17, p. 8
SYL516	12/14/1996	1002	17, p. 1
SYL517	12/14/1996	1005	17, p. 1

Sample ID	Hazardous Substance	Release Concentration (ppbv)	Method Detection Limit	Reference
SYL514	Trichloroethene	38	5	17, p. 9
	Vinyl Chloride	19	5	17, p. 9
SYL514 (Duplicate)	Trichloroethene	57	5	17, p. 9
	Vinyl Chloride	14	5	17, p. 9
SYL516	Trichloroethene	14	4	17, p. 5
SYL517	Methylene Chloride	61	30	17, p. 5
	Trichloroethane, 1,1,1-	190	30	17, p. 5

Notes: The data sheets for the samples above indicate that the sample unit is ppb; however, the analytical method reports the concentrations in ppbv. This assumption was made on the part of the laboratory.

Level I Samples

Sample ID	Hazardous Substance	Hazardous Substance Concentration (Ref. 17, pp. 5, 9)	Benchmark Concentration (mg/m^3)	Benchmark	References
SYL514	Vinyl Chloride	19 ppbv ($0.049\ mg/m^3$)	2.8×10^{-5}	Cancer Risk Screening Concentration	2, p. 44
SYL514 (Duplicate)	Vinyl Chloride	14 ppbv ($0.036\ mg/m^3$)	2.8×10^{-5}	Cancer Risk Screening Concentration	2, p. 44
SYL517	Methylene Chloride	61 ppbv ($0.216\ mg/m^3$)	0.0052	Cancer Risk Screening Concentration	2, p. 38

Notes: Substance concentrations were converted from ppbv to mg/m^3 by first converting ppbv to ppmv and then using the following equation: ppmv x (molecular weight of gas/24.04) (Refs. 19, pp. 1, 6, 14; 20, p. 10).

Attribution

From the 1960s to 1989, the AMCO site was occupied by AMCO Chemical Company. AMCO operated a chemical distribution facility that included a warehouse, railroad spur, aboveground tanks, underground tank, and drums used to transfer and store raw materials (Ref. 5, p. 8).

In March 1986, AMCO hired a contractor to conduct a site investigation and soil sampling in the outside yard area of the AMCO property. Six samples, collected at six locations, revealed a TCA concentration of 25,500 ppb and a 1,1-Dichloroethane concentration of 2,100 ppb (Ref. 6, pp. 1, 5 and 6).

In July 1988, the Oakland Fire Department (OFD) reported leaking drums at the AMCO property to the California Office of Emergency Services. Greater than 100 full and empty 5 and 55 gallon drums were found in an open area behind AMCO's main building. Stenciled labels on the drums indicated that the contents included acetone, 1,1,1-trichloroethane (TCA), methanol, ethylene glycol and methyl ethyl ketone (Ref. 8, p. 1). A d During a subsequent inspection of the AMCO property, inspectors observed several materials leaking and/or already leaked on the ground, including: an "oily liquid identified by the property owner as 'transformer oil' . . . . a powdery solid . . . leaking through holes in the sides [of drums] . . . . [and an] orange, viscous semi-solid, which appeared to be either a soap or a grease, that was flowing onto the ground from a hole in a drum" (Ref. 9, pp. 1 and 3).

In July 1996, DC Metals, the next owner of the property, had a preliminary subsurface investigation conducted. The four soil samples collected indicated hits of vinyl chloride (1000 µg/kg), 1,1-Dichloroethane (5000 µg/kg), 1,2-Dichlorobenzene (16000 µg/kg), and cis-1,2-Dichloroethene (22000 µg/kg) (Ref. 7, pp. 1, 3, 5, and 15).

Construction of a ground water and SVE treatment system began in December 1996. The treatment system began operating in January 1997. During excavation of the treatment trench, vapor was observed entering the atmosphere on two occasions (December 5 and 14, 1996). These events are scored as observed releases by direct observation (see Section 6.1.1, Observed Release by Direct Observation). Air sampling conducted at the excavation perimeter during the two observed release events (December 5 and 14, 1996) documented the presence of vinyl chloride at concentrations up to 120 ppbv in instantaneous ("grab") samples and up to 19 ppbv in 6-hour time-integrated samples from 8-hour SUMMA canisters. Vinyl chloride precursor compounds TCE and PCE were documented at concentrations up to 9,600 and 420 ppbv respectively in grab samples and up to 1,600 and 48 ppbv respectively in time-integrated samples. In addition, several other substances such as methylene chloride; and 1,1,1-TCA were documented in these releases (Ref. 5, pp. 15-16; 17, pp. 5, 9). The concentrations of these substances also meet the observed release criteria (see Section 6.1.1, Likelihood of Release). The samples documenting the substances in the observed releases by direct observation were the same samples that documented the observed releases by chemical analysis, indicating the origin of at least a portion of the observed release by chemical analysis (see Section 6.1.1,

Likelihood of Release).

Commencing in December 1998 and continuing through April 2000, EPA conducted field activities at the AMCO site to support the PA/SI for this site. In December 1998, EPA conducted soil gas and ground water sampling to assess the impact of the cessation of operation of the treatment system on site conditions. EPA also installed three permanent soil gas monitoring points on the site adjacent to residential properties to facilitate gathering data on soil gas migration over time. Results from this sampling event indicated that levels of vinyl chloride in ground water had increased significantly in monitoring wells on the site following shutdown of the emergency treatment systems. Vinyl chloride levels in soil gas had increased at one sample point (point 17) immediately adjacent to residential property from "non-detect" in 1996 to 69 ppbv in September 1998 (Ref. 5, pp. 17-18).

During the September 1999 EPA investigation, soil gas samples and crawl space air samples were collected from three residences adjacent to the site. Vinyl chloride was detected at 0.014 ppbv in one soil gas sample collected from the backyard at 1428 Third Street. Vinyl chloride was detected in the crawl space air samples obtained from three residences at concentrations ranging from 0.02 to 0.045 ppbv. Data for soil gas samples obtained from the permanent site monitoring points indicated the presence of vinyl chloride at 96 ppbv (point 17) and 71 ppbv (point 25). Relative to 1998 data, these sample points showed slightly increased vinyl chloride concentrations (Ref. 5, pp. 19-20).

The last phase of the PA/SI sampling occurred in April 2000. Results indicated that sample data for permanent soil gas monitoring point 25 documented a significant increase in vinyl chloride from the 1999 investigation, from 71 to 820 ppbv. Vinyl chloride was documented in ground water at three onsite boring locations at concentrations ranging from 120 to 27,000 µg/L. Sample data for site ground water monitoring wells document vinyl chloride at 1,700 to 22,000 µg/L (Ref. 5, pp. 21-23).

As indicated by the discussion above of EPA sampling at the site between December 1998-April 2000, soil gas levels of vinyl chloride have continued to increase since the stop of the EPA treatment system. In addition, ground water continues to be contaminated with high levels of VOCs under the site.

Finally, the City of Oakland has indicated that this site is crucial to its development plans for the city. The city expects that development of all parcels fronting Mandela Parkway, between Third and Fifth Streets will be key to the implementation of the West Oakland Transit Village. The AMCO site would be one of the anchor properties for the Village (Ref. 18).

Hazardous Substances Released:

Methylene Chloride
Tetrachloroethene
1,1,1-Trichloroethane
Trichloroethene
Vinyl Chloride

Air Observed Release Factor Value: 550

6.2 WASTE CHARACTERISTICS

6.2.1 TOXICITY/MOBILITY

Hazardous Substance	Source No.	Toxicity Factor Value	Gas Mobility Factor Value	Toxicity/ Mobility Factor Value (Ref. 1, Table 6-13)	Ref.
Butylbenzene, sec-	1	–	–	–	
Chlorobenzene	1	100	1	100	2, p. 5
Chloroethane (Ethyl Chloride)	1	1	1	1	2, p. 10
Dichlorobenzene, 1,2-	1	10	1	10	2, p. 7
Dichlorobenzene, 1,3-	1	–	1	–	2, p. 7
Dichlorobenzene, 1,4-	1	10	1	10	2, p. 7
Dichloroethane, 1,1-	1	10	1	10	2, p. 7
Dichloroethene, cis-1,2- (Dichloroethylene, cis-1,2-)	1	100	1	100	2, p. 8
Isopropylbenzene (Cumene)	1	1,000	1	1,000	2, p. 6
Isopropyltoluene, 4-	1	–	–	–	
Methyl Isobutyl Ketone	1	–	–	–	
Naphthalene	1	100	0.2	20	2, p. 14
Propylbenzene, n-	1	–	–	–	
Tetrachloroethene (Tetrachloroethylene)	1	100	1	100	2, p. 18
Trichlorobenzene, 1,2,3-	1	–	–	–	
Trichlorobenzene, 1,2,4-	1	100	1	100	2, p. 19
Trichloroethane, 1,1,1-	1	1	1	1	2, p. 19
Trichloroethene (Trichloroethylene)	1	10	1	10	2, p. 19
Trimethylbenzene, 1,2,4-	1	–	–	–	
Trimethylbenzene, 1,3,5-	1	–	–	–	
Vinyl Chloride	1	10,000	1	10,000	2, p. 20

Notes: Substances listed in parenthesis are the synonym as listed in SCDM.

* Xylene was detected specifically in the observed release (OR). Xylene was also found in the source however the type was not specified in the data tables.

Values that could not be found in SCDM were designated with a dash (–).

6.2.1 TOXICITY/MOBILITY (continued)

The hazardous substance with the highest Toxicity/Mobility value of 10,000 is vinyl chloride.

Toxicity/Mobility Factor Value: 10,000

6.2.2 HAZARDOUS WASTE QUANTITY

Source No.	Source Type	Source Hazardous Waste Quantity
1	Contaminated Soil	>0

Sum of Values: 0.19

HRS Table 2-6 assigns a hazardous waste quantity (HWQ) factor value for this pathway of 1. However, as stated in HRS Section 2.4.2.2, *Calculation of hazardous waste quantity factor value*, "[i]f any target for that migration pathway is subject to Level I or Level II concentrations . . . assign either the value from Table 2-6 or a value of 100, which ever is greater, as the hazardous waste quantity factor value for the pathway." As there are targets associated with this site that are subject to Level II concentrations of hazardous substances (see Section 6.3 of this document), the HWQ factor value assigned is 100.

Hazardous Waste Quantity Factor Value: 100
(Ref. 1, Section 2.4.2.2, Table 2-6)

6.2.3 WASTE CHARACTERISTICS FACTOR CATEGORY VALUE

Toxicity/mobility Factor Value: 10,000
Hazardous Waste Quantity Factor Value: 100

Toxicity/mobility Factor Value x
Hazardous Waste Quantity Factor Value: 1,000,000

Waste Characteristics Factor Category Value: 32
(Ref. 1, Table 2-7)

6.3 TARGETS

Level I Distance Categories

Sample ID: SYL514 and SYL517
Location: On the border of the trench opening
References: 2, pp. 38, 44; 5, pp. 15-16; 12, pp. 21, 22; 17, pp. 1, 5, 8-9, 22; 22, pp. 2, 13

Source: Contaminated Soil
Distance from the source in miles: 0
References: 5, p. 15-16; 16, p. 1; 17, pp. 1, 5, 8-9, 22; 21; 22, pp. 2, 13
Distance categories subject to Level I concentrations: 0-distance category (directly on the source)

Level II Distance Categories

Sample ID: SYL516
Location: In front of 1428 Third Street - the nearest residence, directly east of the site.
References: 5, p. 15-16; 12, p. 24; 17, pp. 1, 5, 22 ; 22, p. 13

Source: Contaminated Soil
Distance from the source in miles: 0.009 mile (50 feet)
References: 5, p. 15-16; 16, p.1; 17, pp. 1,5, 22; 21; 22, p. 13
Distance categories subject to Level II concentrations: >0 - 1/4 mile

Actual Contamination Distance Categories

On the source and the >0 - 1/4 mile distance category are subject to actual contamination (Refs. 16, p. 1; 12, pp. 21, 22, 24; 17, p. 1, 5, 8-9, 22; 21; 22, pp. 2, 13).

Potential Contamination Distance Categories

Samples were not collected in the 1/4-1/2, 1/2-1, 1-2, 2-3, and 3-4 mile distance category. Therefore, these distance categories are subject to potential contamination.

6.3.1 NEAREST INDIVIDUAL

SUMMA canister sample SYL516 was collected from a location in front of the nearest residence, 1428 Third Street, which is located adjacent to the site and approximately 50 feet from the contaminated soil source (source 1) (Ref. 5, pp. 15-16; 17, p. 1, 22; 21; 22, p. 13). Results indicate the presence of TCE at observed release levels (Refs. 12, p. 24; 17, p. 5). According to the 2000 U.S. Census, there are 618 people living in the >0 to 0.25 - mile distance ring (Ref. 16, p. 2). As there is no atmospheric health-based benchmark values for TCE, these targets are subject to Level II contamination (Refs. 1, Sections 6.3, 2.5.1-2.5.2; 2, p. 43). The nearest individual factor is assigned a value of 45 (Ref. 1, Section 6.3.1).

Nearest Individual - Level II Concentrations

Residence, building or area subject to Level II concentrations: 1428 Third Street

Location: In front of the nearest residence, directly east of the site.

Source: Contaminated Soil

Distance from the nearest source in miles: 0.009 mile (50 feet)

References: 5, pp. 15-16; 17, p. 1, 5, 22; 21; 22, p. 13

Nearest Individual Factor Value: 45

(Ref. 1, Section 6.3.1)

6.3.2 POPULATION

6.3.2.2 Level I Concentrations

Samples were collected documenting Level I concentrations of hazardous substances releases that occurred on source 1 (see Level I Table on p. 25) (Ref. 5, pp. 15-16; 17, p. 1, 5, 8-9, 22; 21; 22, p. 2, 13). At the time of the release, a hot zone had been established around all digging, and only authorized personal with Level B protection were allowed into the hot zone. Since no targets were subject to the Level I concentration, the factor value is zero (Ref. 22, p. 1).

Level I Concentrations Factor Value: 0

6.3.2.3 Level II Concentrations

SUMMA canister sample SYL516 was collected from a location in front of the nearest residence, 1428 Third Street, which is located adjacent to the site and approximately 50 feet from the contaminated soil source (Ref. 5, pp. 15-16; 17, p. 1, 22; 21; 22, p. 13). Results indicate the presence of TCE at observed release levels (Ref. 1, Table 2-3; Ref. 12, p. 24; 17, p. 5). According to the 2000 U.S. Census, there are 618 people living in the >0 to 0.25 - mile distance ring (Ref. 16, p. 2). In addition, there are approximately three people who work regularly on the property (Ref. 23). As there are no health-based benchmark values for TCE, these targets are subject to Level II contamination (Refs. 1, Sections 6.3, 2.5.1-2.5.2; 2, p. 43).

Distance Category	Population	References
>0 - 1/4	615 (residents)	16, p. 2
>0 - 1/4	3 (workers)	23

Sum of Population Exposed to Level II Concentrations: 618

Level II Concentrations Factor Value: 618

6.3.2.4. Potential Contamination

Distance Category	Population	Reference	Population Range (Ref. 1, Table 6-17)	Distance-Weighted Population Value (Ref. 1, Table 6-17)
1/4-1/2	3,225	16, p. 2	3,001-10,000	282
1/2-1	9,963	16, p. 2	3,001-10,000	83
1-2	37,615	16, p. 2	30,001-100,000	266
2-3	94, 745	16, p. 2	30,001-100,000	120
3-4	106,556	16, p. 2	100,001-300,000	229

Sum of Distance-weighted Population
Subject to Potential Contamination: 980

Sum of Distance-weighted Population
Subject to Potential Contamination/10 = 98

Potential Contamination Factor Value: 98

6.3.3 RESOURCES

There are no known resources within the 4-mile target distance limit.

Resources Factor Value: 0

6.3.4 SENSITIVE ENVIRONMENTS

The nearest sensitive environments are located in marine habitats associated with San Francisco Bay, approximately 1-2 miles from the site (Ref. 16, p. 5). Since these sensitive environments are subject to only potential contamination, they would not contribute significantly to the air pathway score. Therefore, the sensitive environment value was not determined.

Sensitive Environment Actual Contamination Factor Value: NS

Sensitive Environment Potential Contamination Factor Value: NS